



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

were acquired which led the creature, *then* neither frigate-bird nor gull, to get its food by association with some messmate more able to procure it. Then these two forms diverged from the common ancestor, acquiring new traits from new environments. As the frigate-birds gained dominion of the air, they also gained dominion of species of fish-hawks, which became enslaved by them. But the hawks also diverged into other species, one or more of which retained the terror, but not the discipline, and, when commanded, would not comply, through sheer ignorance of the nature of the demand. When the birds met with a specimen of this branched stock, they urged obedience with such vigor as to result in the death of their unfortunate victim. Then the old ancestral habit, which may be had outlived a thousand generations, comes into play, and they stand on the dead body, in pure friendship, waiting to be fed! What do they know of the mystery of death? The only weak place is where the branching hawk forgot the duty of fishing for its master, but not the terror of its presence. But then fear is what prompts it to escape from an enemy and thereby save its life, so that this emotion would properly survive the other.

—:O:—

## A STUDY OF GARDEN LETTUCE.

BY E. L. STURTEVANT, M.D.

AT the New York Agricultural Experiment station, in 1885, eighty-three distinct varieties of lettuce were grown under nearly two hundred names. These lettuces present to the onlooker three distinct form-species, the lanceolate-leaved, the Cos and the cabbage. It is a pertinent inquiry as to whether these form-species are of distinct origin or have been produced by cultivation within recent times, and we hence offer a succinct account of our historical investigations.

The lanceolate-leaved form is represented with us by one variety only, the deer's tongue, introduced as a seedsman's novelty in 1883. The type of this form is perhaps referred to by Pliny, lib. XIX, c. 38, "*præterea longi et angusti intubi similis*," as this plant of ours has a chicory-like appearance in some stages of its growth. It is certainly mentioned by Bauhin<sup>1</sup> in 1621, and credited in his synonymy to Castor, 1585; and is figured by Bauhin<sup>2</sup>

<sup>1</sup> Pinax, ed. of 1621.

<sup>2</sup> Prodomos, ed. of 1671,

in 1671. Vilmorin,<sup>1</sup> 1883, refers to this type of lettuce under the name *Romaine asperge*, *Lactuca angustana* Hort., and a variety *L. cracoviensis* Hort. *L. angustana* Allionii, 1785, seems to be of this form-species, and is recorded as found wild in Switzerland, and Martyn's *Millers Dictionary* deems the *Chicoreum constantinopolitanum* of Parkinson, 1640, to have some affinity to it.

The Cos lettuces are distinguished by the upright growth of the root leaves and the elongated and spatulate form of the leaf; they are also subject to a flattening of the stalk through fasciation. They were perhaps known to the ancient Romans, as witness Pliny's<sup>2</sup> statement: "Diligentiores plura genera faciunt: purpurea crispas, Cappadocas, Græcos. Longioris has folii, caulisque lati; præterea longi et angusti, intubi similis." Palladius<sup>3</sup> mention of the process of blanching can be also quoted: "Candidæ fieri putantur, si fluminis arena vel litoris frequentur spargatur in medias, and collectis ipsæ foliis alligentur." The Cos lettuce is the *Lactuca Romana* dulcior, nigriore and *Scariole hortensis folio*, semine nigro of Pena and Lobel,<sup>4</sup> 1570. Bauhin in his *Pinax* considers this form to be the *L. foliis obscurius virentibus nigra* Plinio of Dodænus,<sup>5</sup> the *L. nigra* of Cæsalpinus, 1583, and the *L. romana* of Castor Durantes, 1585. In the sixteenth century the Cos form seems to have been less grown in Northern Europe than in the south, for Pena and Lobel<sup>6</sup> say it is rarely cultivated in France and Germany, more frequently in Italy, especially at Rome. It reached France in 1537.<sup>7</sup>

The class of cabbage lettuces are distinguished by the rounded and spatulate leaf which grows less upright than the Cos. Although the commentators of the sixteenth and seventeenth centuries deem this class to have been known to the ancient Greeks and Romans, and identify it with the *Laconicon* of Pliny and the *Tartesian* or *Bætica* of Columella, yet I am unable to find any certain evidence. The only word I find in Pliny which could suggest this class is "crispa," which may be translated "wrinkled," and as a class the cabbage lettuces are more wrinkled or

<sup>1</sup> Les Plantes Potageres.

<sup>2</sup> Nat. Hist., lib. xix, c. 38.

<sup>3</sup> De Re Rustica, lib. ii, c. 14.

<sup>4</sup> Stirpium Adversaria Nova, Londini, 1570, p. 90.

<sup>5</sup> Pemptades, 1621, p. 644.

<sup>6</sup> Loc. cit.

<sup>7</sup> Herze. Lesve. Alim. i, p. v.

blistered than are the Cos. Columella was a native of Gades, but resided principally at Rome. He<sup>1</sup> speaks of two kinds which may belong to this class, one the Cappadocean "Tertia, quæ spisso, sed puro vertice pallet," and "quæ pallido and pexo densoque folio viret;" the other the Tartesian or Bætica, which he says is from his country :

"Et mæ, quam generant Tartesi litore Gades

Candida vibrato discrimine, candida thyrsos est,"

and "quæ deinde candida est and crispissimi folii, ut in provincia Bætica and finibus Gaditani municipii." The words "vibrato discrimine" and "crispissimi folii" would imply a curled cutting lettuce. The heading lettuces of this class were, however, well known to the writers of the sixteenth and seventeenth centuries. Anton Pinaeus,<sup>2</sup> 1561, figures one which closely resembles the stone tennis ball variety of our gardens, and Bauhin in his synonymy identifies with varieties described by Tragus, 1553, Tabernæmontanus 1588, Matthiolus 1586, Gerarde 1597, etc., etc.

Whether the types of the Cos and the cabbage form-species occur in nature, I have not the material for study to determine. De Candolle<sup>3</sup> says "botanists are agreed in considering the cultivated lettuce as a modification of the wild species called *Lactuca scariola*. The latter grows in temperate and Southern Europe, in the Canary isles, Madeira, Algeria, Abyssinia and in the temperate regions of Eastern Asia. Boissier speaks of specimens from Arabia Petrea to Mesopotamia and the Caucasus. He mentions a variety with crinkled<sup>4</sup> leaves, similar, therefore, to some of our garden lettuces, which the traveler Hausknecht brought with him from the mountains of Kurdistan. I have a specimen from Siberia, found near the River Irtysh, and it is now known with certainty that the species grows in the north of India, in Kashmir and in Nepal." From this reference we might infer that the Kurdistan form belonged to the cabbage type, as possessing distinctly wrinkled or savoy-like leaves, while the description of the ordinary *L. scariola* of Europe implies the Cos type.

I have not opportunity of access to herbariums whereby I can hope to satisfy myself of the condition of the wild forms from

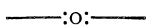
<sup>1</sup> De Re Rustica, x, l. 183; xi, c. 3; x, l. 185.

<sup>2</sup> Hist. Plants, 1561.

<sup>3</sup> Origin of Cultivated Plants, 1885, p. 95.

<sup>4</sup> The word in the original French edition, p. 76, is *crispee*, which should rather be translated wrinkled or bullate.

various countries, but such evidence as I have here outlined strongly supports the hypothesis that our three form-species of lettuce have originated from wild forms which have been brought into culture in different regions, and hence that our three form-species have different origin. The history of lettuce as published affords no clue towards settling this point. Lettuces are supposed to have been grown by the Persians some five hundred years before Christ, and to have been introduced into China between the years 600 and 900 of our era; they were mentioned by Chaucer in England in the fourteenth century, and reached America with Columbus.



## AQUATIC RESPIRATION IN SOFT-SHELLED TURTLES: A CONTRIBUTION TO THE PHYSIOLOGY OF RESPIRATION IN VERTEBRATES.<sup>1</sup>

BY SIMON H. AND SUSANNA PHELPS GAGE.

IT was formerly supposed that in all reptiles the respiration was exclusively ærial at all periods of their life, and that the lungs were the only respiratory organs. We have demonstrated, however, that in soft-shelled turtles (*Amyda mutica* and *Aspionectes spirifer*) there is in addition a true aquatic respiration. This is *indicated* by three facts: (*a*) These turtles remain most of the time in water, and voluntarily remain entirely under from two to ten consecutive hours; (*b*) while under water they fill and empty the mouth and pharynx, about sixteen times per minute, by movements of the hyoid apparatus, the general appearance being like the respiratory movements of a fish; (*c*) the mucous membrane of the pharynx is closely beset with filamentous processes, appearing like the villi of the small intestine of a mammal or the gill filaments of *Necturus*. These processes are especially numerous along the hyoid arches and around the glottis, and are copiously supplied with blood.<sup>2</sup>

<sup>1</sup> A preliminary paper upon the respiration of *Aspionectes* was presented to the A. A. S. by the senior author in 1883, and printed on p. 316 of the Proceedings (Vol. xxxii).

<sup>2</sup> So far as we know but two original observations (besides that mentioned in the preceding foot-note) have been previously made upon the Trionychidæ bearing upon the subject of this paper: (*a*) In February, 1856, Dr. A. Sager called attention to the processes in the pharynx of *Aspionectes*, and compared them, in appearance, with the gill filaments of *Necturus* and the inner gills of tadpoles. (*b*) Professor L.